DATA MANAGEMENT STRATEGIES TO SUPPORT U.S. POSTAL SERVICE STORM WATER PERMITTING

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Abstract. A procedure for creating a data management system for managing and monitoring environmental compliance of facilities is discussed with the aid of a case study. Client/server technology can be used to support large multi-user and multi-facility information management requirements and various environmental information management needs at different functional levels of the U.S. Postal Service.

INTRODUCTION

Environmental compliance monitoring and information management poses a significant challenge for the industry and government agencies with facilities regulated under multiple environmental regulations. The problem is exacerbated when the facilities are spread out over a large geographic area either regionally or nationally. A data management system operating on a PC-based client/server platform provides the U.S. Postal Service (USPS) with a powerful tool to manage and monitor compliance of their facilities.

The first step in this project consisted of defining end-user requirements. From this information data elements were identified for different functional levels of the USPS and supporting relational models were constructed for the Environmental Information System (EMIS) storm water database. Next, a comprehensive client-side application module was designed to support two objectives: (1) provide a tool for supporting storm water permitting of USPS Vehicle Maintenance Facilities (VMFs); and (2) provide a simple way for end-users to perform compliance monitoring. The approach discussed below illustrates the way in which properly designed data management systems can be used to support storm water permitting at varying level in either private or public sectors.

BACKGROUND

The U.S. Postal Service has over 300 Vehicle Maintenance Facilities (VMF) across the country, of which over 200 are regulated by EPA's NPDES storm water regulations for industrial activities. These VMFs in different states are governed either by EPA's NPDES Baseline or Multi-Sector General Permits, or individual state general permits.

Compliance management is performed at varying levels throughout the USPS. The VMF Manager is in charge of administering the facility's Storm Water Pollution Prevention Plan (SWPPP) and insuring that the facility maintains compliance with the storm water permits. In addition to other responsibilities, the District and Area Environmental Compliance Coordinators are responsible for monitoring VMF compliance. At present, VMF compliance monitoring and reporting is performed using conventional means such as: telephone calls, memoranda, e-mail, etc. This information is transmitted from the VMF Manager to the District Environmental Compliance Coordinator and in turn forwarded to the Area Environmental Compliance Coordinator and the headquarters, as requested.

The Postal Service has developed a storm water database module in their EMIS. The EMIS system was developed to facilitate the communication of information and to develop compliance and related cost data at the VMF level or at other operational units. EMIS is an Oracle-based data management system with powerful querying ability and used a distributed client/server system for managing environmental information throughout the organization. EMIS combines the power of a centralized multi-user server database with the convenience of distributed client-side application modules using desktop PC's. Additional EMIS modules, besides storm water, are under development to support other environmental programs, such as asbestos

management, underground storage tanks, etc.

APPROACH

The approach undertaken in the design and development of the EMIS storm water database and the client-side application module included the following key elements:

- Needs Assessment
- Conceptual Design
- Peer Review
- Final Conceptual Design
- Module Development

Initially, a Technical Advisory Committee (TAC) was assembled to establish the design objectives for the EMIS storm water database and to guide the design of the client-side application module. The primary objective of the TAC was to consider end-user needs and provide guidance throughout the process. As originally formed, the TAC was expanded to include other ad-hoc members as discussion warranted. In our case, we found that the TAC was most productive with a small number of highly knowledgeable members which were brought together in a series of structured working sessions. In examining the project objectives, the TAC discussions revolved around the following elements:

- Monitor compliance status by facility
- Measure cost of compliance by facility
- Assist with implementation of permits at the facility level
- Function as on-line electronic library for regulations and policies

By using this approach, we were able to prioritize the items in the needs assessment, define subsequent data elements and the supporting relational models for the EMIS storm water database, insure that the client-side application module would meet end-user needs at varying level of the organization, and enable the application design to be subsequently modified with relative ease to incorporate other data elements in order of priority, as warranted.

We began Conceptual Design of the EMIS database and client-side application module after the Needs Assessment was completed. At this point, we understood that our task must support two primary objectives: (1) provide a client-side tool for supporting storm water permitting at the VMF level; and (2) provide a simple way for the Environmental Compliance Coordinators to perform compliance monitoring via EMIS. In addition, a subset of the data stored in the client-side application module needed to support EMIS requirements as defined at the national level for the organization.

The Conceptual Design included the formal presentation of the data dictionary, relational model, business rules required to support EMIS, and the graphical layout of the EMIS relational model were selected from alist of approximately 150 elements.

In addition, the Conceptual Design process included the client-side application module design and layout showing the logical relationship among various user interfaces and user functionality. The client-side application module was conceptually designed to fulfill the two primary objectives stated above.

Following review of the Conceptual Design by the TAC and other USPS staff members, the conceptual design and layout was finalized. User interface screens for the integrated EMIS and client-side application module were designed to provide compliance information at a glance to the end-user. A "traffic light" image indicating the status of primary regulatory criteria such as: Best Management Practices; Monitoring, Inspection, Training, and Permits was used for ease of use.

These criteria and subsequent underlying rules enable the user to "visually" determine the status of storm water permit compliance of each facility. A green light indicates that the activity or criterion is in compliance with the requirements of the permit and a red light would indicate that it is not and requires immediate attention. A yellow light would indicate that work is either underway by the VMF or that a VMF Manager should be cautioned that a certain item will require their attention shortly. Operational rules for triggering the red, green, or yellow compliance indicators are included with the sample user interface screens.

CONCLUSIONS

Based on the results of the final Conceptual Design, the USPS is beginning development on the EMIS storm water module. It is anticipated that development of the client-side application module to support VMF needs will be undertaken in the near future. This PC-based client/server system will provide a powerful management tool for user at all levels of the USPS. As designed, the client-side (VMF) application module and the EMIS module will be linked to provide the appropriate user tool for managing

environmental information on a facility, area, or national basis. This approach permits data to be maintained and managed by the appropriate end-user while permitting upward reporting from the facility level to the upper levels in the organization.

A summary of benefits for such a system to others includes:

- A multi-user database
- Distributed system linked to individual facilities regionally or globally
- Interaction with other information systems
- Flexibility in design and expansion of the system to grow with needs
- Monitor key compliance elements on-line
- Obtain cost data for compliance by facility or activity
- Update regulatory information expeditiously with little or no paperwork
- Applicable to public or private sector entities

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